

Sub B17

1. A method of inspecting a coin thrown into a machine, comprising the steps of:

(a) arranging an exciting coil and a receiving coil in the vicinity of one side of a coin passage so that said exciting coil and said receiving coil are electromagnetically coupled with each other;

(b) exciting said exciting coil to oscillate at such a frequency that an influence of a reactive magnetic field caused by eddy current induced on a surface of the thrown coin when the coin passes through an electromagnetic field produced by said exciting coil is detected by said receiving coil; and

(c) discriminating authenticity of the thrown coin based on at least one of amplitude, frequency and phase of an oscillation voltage of said exciting coil, and an electromotive force signal detected by said receiving coil.

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2. A method of inspecting a coin according to claim 1, wherein said frequency in said step (b) is preset in accordance with material of the coin to be inspected.

3. A method of inspecting a coin according to claim 1, wherein said step (c) includes a step of determining material of the thrown coin based on the amplitude of the oscillation voltage of said exciting coil.

4. A method of inspecting a coin according to claim 1, wherein said step (c) includes the steps of sampling said electromotive force signal in every predetermined period, and performing a statistical process based on the

sampled values to determine a feature of the thrown coin.

5. A method of inspecting a coin according to claim 4, wherein said statistical process includes the steps of obtaining a coefficient of correlation of said sampled values with respect to a reference coin, and discriminating the thrown coin based on magnitude of said correlation coefficient.

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6. A method of inspecting a coin thrown into a machine, comprising the steps of:

(a) arranging an exciting coil in the vicinity of one side of a coin passage inclined at a predetermined angle so that magnetic poles thereof face the coin passage;

(b) arranging two receiving coils with substantially identical characteristics in the vicinity of said one side of said coin passage so that said receiving coils are electromagnetically coupled with said exciting coil;

(c) exciting said exciting coil at a predetermined frequency to produce an electromagnetic field; and

(d) discriminating authenticity of the thrown coin based on at least one of amplitude, frequency and phase of an oscillation voltage of said exciting coil, and an electromotive force signal detected by said two receiving coils.

7. A method of inspecting a coin according to claim 6, wherein said frequency in said step (c) is preset in accordance with material of the coin to be inspected.

8. A method of inspecting a coin according to claim 6, wherein said

step (d) includes a step of determining material of the thrown coin based on the amplitude of the oscillation voltage of said exciting coil.

9. A method of inspecting a coin according to claim 6, wherein said step (d) includes the steps of sampling said electromotive force signal in every predetermined period, and performing a statistical process based on the sampled values to determine a feature of the thrown coin.

10. A method of inspecting a coin according to claim 9, wherein said statistical process includes the steps of obtaining a coefficient of correlation of said sampled values with respect to a reference coin, and discriminating the coin based on magnitude of said correlation coefficient.

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11. An apparatus for inspecting a coin thrown into a machine, comprising:

an exciting coil arranged in the vicinity of one side of a coin passage;  
a receiving coil arranged in the vicinity of said one side of said coin passage so as to be electromagnetically coupled with said exciting coil;

oscillation means for exciting and oscillating said exciting coil at a predetermined frequency to produce an electromagnetic field;

first detecting means for detecting at least one of amplitude, frequency and phase of an oscillation voltage of said exciting coil;

second detecting means for detecting an electromotive force signal generated in said receiving coil; and

discriminating means for discriminating authenticity of the thrown coin based on detection outputs from said first and second detecting means.

12. An apparatus for inspecting a coin according to claim 11, wherein said predetermined frequency is set in accordance with material of the coin to be discriminated.

13. An apparatus for inspecting a coin according to claim 11, wherein said discriminating means determines material of the thrown coin based on the amplitude of the oscillation voltage of said exciting coil.

~~14. An apparatus for inspecting a coin according to claim 11, wherein said discriminating means samples said electromotive force signal in every predetermined period, and performs a statistical process based on the sampled values to determine a feature of the thrown coin.~~

15. An apparatus for inspecting a coin according to claim 14, wherein said statistical process is performed by obtaining a coefficient of correlation of said sampled values with respect to a reference coin, and discriminating the thrown coin based on magnitude of said correlation coefficient.

Sub B17 16. An apparatus for inspecting a coin thrown into a machine, comprising:

an exciting coil arranged in the vicinity of one side of a coin passage inclined at a predetermined angle so that magnetic poles thereof face the coin passage;

two receiving coils having substantially identical characteristics and arranged in the vicinity of said one side of said coin passage so that said receiving coils are electromagnetically coupled with said exciting coil;

oscillation means for exciting and oscillating said exciting coil at a predetermined frequency to produce an electromagnetic field;

first detecting means for detecting at least one of amplitude, frequency and phase of an oscillation voltage of said exciting coil;

second detecting means for detecting an electromotive force signal generated in said two receiving coils; and

discriminating means for discriminating authenticity of the thrown coin based on detection outputs from said first and second detecting means.

17. An apparatus for inspecting a coin according to claim 16, wherein said first detecting means includes a first detector circuit for outputting a direct voltage signal corresponding to the oscillation voltage of said exciting coil.

18. An apparatus for inspecting a coin according to claim 16, wherein said second detecting means comprises a bridge circuit including said two receiving coils, a differential amplifier circuit for amplifying an alternating voltage signal outputted from said bridge circuit and outputting the amplified signal, and a second detector circuit for detecting and rectifying the alternating voltage signal from said differential amplifier circuit and converting the same into a direct voltage signal corresponding to the output of said bridge circuit.

19. An apparatus for inspecting a coin according to claim 16, wherein said predetermined frequency is set in accordance with material of the coin to be inspected.

20. An apparatus for inspecting a coin according to claim 16, wherein

said discriminating means discriminates material of the brown coin based on the amplitude of the oscillation voltage of said exciting coil.

21. An apparatus for inspecting a coin according to claim 16, wherein said exciting coil is arranged at a predetermined distance from said receiving coils so that a line connecting centers of magnetic poles of said exciting coil is substantially parallel with an extending direction of said coin passage, and said two receiving coils are arranged above a coin rail provided with said coin passage so that a line connecting centers of said two receiving coils is substantially parallel with an extending direction of said coin passage.

22. An apparatus for inspecting a coin according to claim 16, wherein said exciting coil is arranged at a predetermined distance from said receiving coils so that a line connecting centers of magnetic poles of said exciting coil is substantially perpendicular to an extending direction of said coin passage, and said two receiving coils are arranged above a coin rail provided with said coin passage so that a line connecting centers of said two receiving coils is substantially parallel with an extending direction of said coin passage.

23. An apparatus for inspecting a coin according to claim 16, wherein said exciting coil is arranged at a predetermined distance from said receiving coils so that a line connecting centers of magnetic poles of said exciting coil is substantially parallel with an extending direction of said coin passage, and said two receiving coils are arranged above a coin rail provided with said coin passage so that a line connecting centers of said two receiving coils is substantially perpendicular to an extending direction of said coin passage.

24. An apparatus for inspecting a coin according to claim 16, wherein said coin passage is formed so that a coin passing therethrough is inclined to said one side of said coin passage where said exciting coil and said receiving coils are arranged.

25. An apparatus for inspecting a coin according to claim 16, wherein said discriminating means samples said electromotive force signal in every predetermined period, and performs a statistical process based on the sampled values to determine a feature of the thrown coin.

*Sub C17* 26. An apparatus for inspecting a coin according to claim 21, wherein said statistical process is performed by obtaining a coefficient of correlation of said sampled values with respect to a reference coin, and discriminating the coin based on magnitude of said correlation coefficient.

*Sub C57* 27. An apparatus for inspecting a coin, comprising:  
an exciting coil arranged in the vicinity of one side of a coin passage inclined at a predetermined angle so that two magnetic poles thereof face the coin passage;

two receiving coils having substantially identical characteristics and arranged in the vicinity of said one side of said coin passage so that said receiving coils are electromagnetically coupled with said exciting coil;

oscillation circuit means arranged with said exciting coil as an oscillation element;

first detector circuit means connected to said oscillation circuit means;

bridge circuit means arranged to include said receiving coils;

differential amplifier means connected to said bridge circuit means;  
second detector circuit means connected to said differential amplifier  
means; and

discriminating means connected to said first and second detector  
circuit means to determine whether or not the thrown coin has a given feature  
based on outputs of said first and second detector circuit means when the  
thrown coin acts in said electromagnetic field, and output a result of the  
discrimination.